INFORMATION SOCIETY TECHNOLOGIES (IST) PROGRAMME

SmartSketches

Demonstrator I (upholstery) - User Manual

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AUTHORS: P. Fortunato, B. Mendes (MIND)

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Executive Summary

This user manual describes how to use the demonstrator made by MIND targeted at the car seat upholstery industry. Besides from being a generic “getting started” manual with interface driven by a classic command interface it is also the operator support material used in the user testing. The first section is dedicated to the specialized functionality that one can find in such a product targeted to a specialized industry. We are including, for example, stitching functionality in this category. After wards, what we did in the context of the SmartSketches project, is reflected on a section dedicated to sketching interface. The technical details of how this was accomplished could be found on the deliverable D26a. The scope of this document will solely focus on what the user can see and interact upon.

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1. Overview

Nowadays no one would deny the inherent advantage of using a word processor. But initially it was not that obvious why we should use them. It takes a good amount of time to teach someone to use it for the first time, and most users can hand write faster than they can type. So why is this software an indispensable addition to computers everywhere? The answer is simple: versatility!

We can correct and review text easily, even major changes can be accomplished painlessly and different variations can be tested until we find the best one. We can quickly and cheaply make backup copies to safeguard work, either finished or in progress. Distribution, outside review and presentation are made trivial.

Likewise CarSeat Design will require from the user some time to learn to use it. But that time is not spent – it is invested.
Yes, it might take longer to draw a seat than it would on paper. But after it is done you can show it from any angle, change the lighting, colors, textures and stitches. Want to see how the final result would look if you had made a certain style line differently? Fine… just change that line and everything will follow automatically. A new horizon of interactivity opens up, allowing real-time changes to be done to reflect the client's or other designer's suggestions. For little more than the time cost of drawing one style, several can be made, testing different materials, colors or small style changes. Presenting your work to clients and peers is made easy and natural, as they can see and manipulate a photorealistic reproduction of the final product.

The objective of this document is to give you a quick rundown of how to use Car Seat Design. The user-friendly interaction that characterizes this software and this manual will ensure a frustration free process. You will find you are up to speed in no-time.

Just like word processors are widely regarded as essential, we are certain you will soon find Car Seat Design a crucial tool for your work!

2. Principles of operation

To rotate the view, press the **Middle Mouse Button** and move the mouse in the desired direction. You can also use the **Arrow Keys** to rotate, and **Alt + Arrow Keys** to fine tune your rotation.

To move use **Shift + Middle Mouse Button** while moving the mouse. This will pan the view in the same direction as the mouse is moving. Pressing **Shift + Arrow Keys** will also pan the view in the appropriate direction.

Ctrl + Middle Mouse Button will zoom in (look closer) if the mouse moves up. If the mouse is dragged down it will zoom out the view (pull away). The + and - keys in the keypad will also zoom in and out.

3. Command interface

A brief description of the traditional command interface that was already implemented on the prototype before contributions from the SmartSketches project started to be incorporated.

3.1 Loading and viewing a Project

To begin your work, the first thing you will need to do is creating a project. You can do it in two ways: By loading a new mould over which to draw the seat style, or by loading an existing project to continue or previous work.

3.1.1 Starting a new project

Choose the menu option **File->New**, press **Ctrl+N** or click the **Create New Project** button in the **Main** toolbar.

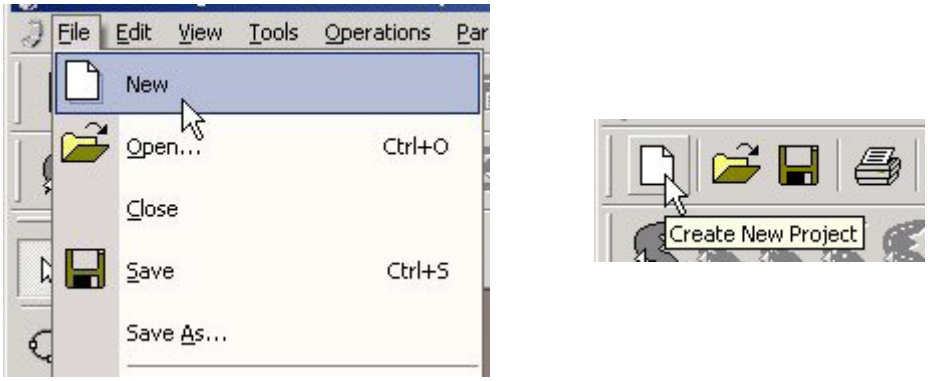


Figure 1 - Starting new project

A new dialog will appear, requesting the location of the appropriate mould. Just select the *IGES* file intended and select **Open**.

3.1.2 Loading an existing project

Choose the menu option **File->Open**, press **Ctrl+O** or click the **Open Project** button in the **Main** toolbar.

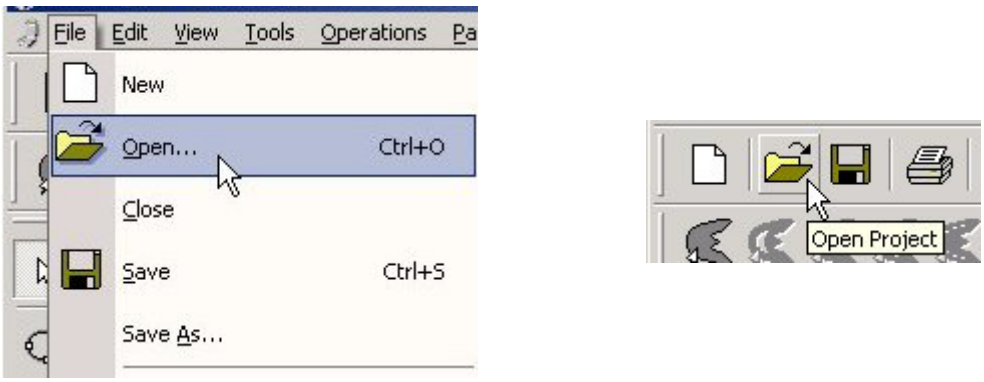


Figure 2 - Loading existing project

A new dialog will appear, requesting the location of the project to load. Just select the *S3D* file with the project and press the **Open** button.

3.1.3 Changing the lighting

There are two different ways to change the lighting.

You can select one of four presets by using the **View->Image Properties** menu option. You can choose one under the **Lighting** box. Each preset has a certain number of lights positioned to provide good all-around lighting.

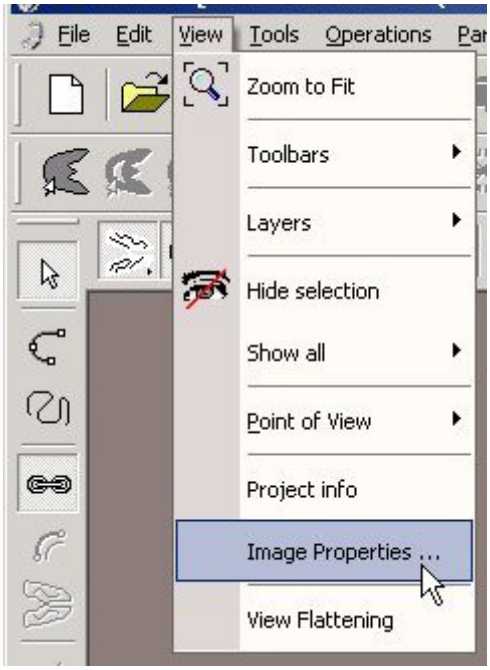


Figure 3 - Change the lighting option

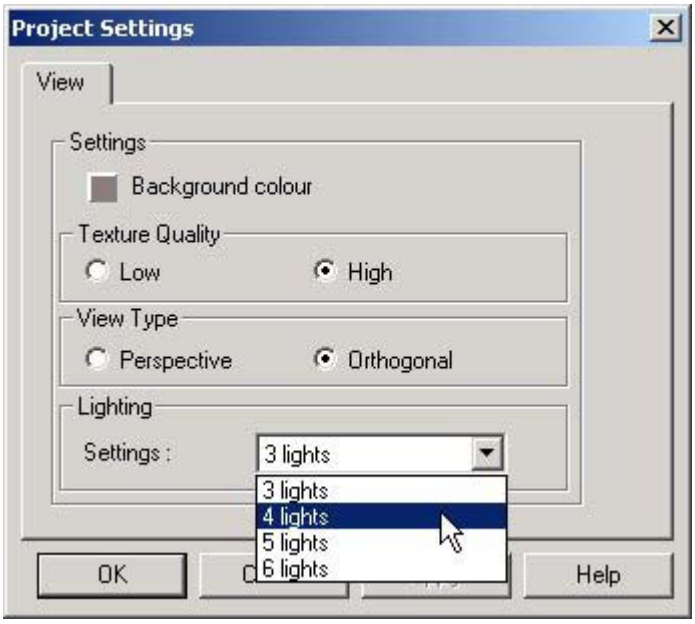


Figure 4 - Project settings panel

The other way to change the lighting is to manually place, delete, move and alter lights. To do so you must select the menu option **Tools->Selection->Light Selection**. This will activate the light selection tool and make the light place-holders visible.

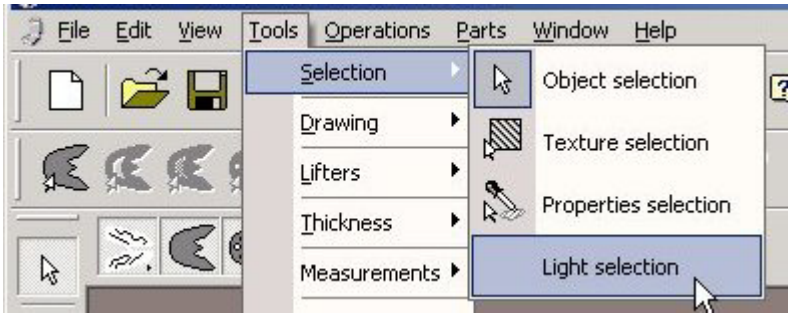


Figure 5 - Alternative option of changing lighting

To place a new light, just click with the **Left Mouse Button** where you want the new light to appear.

To delete an existing light, select it by clicking on the place-holder with the **Left Mouse Button**. A box will appear around the base of the place-holder confirming you selection. Now simply press the **Delete** key.

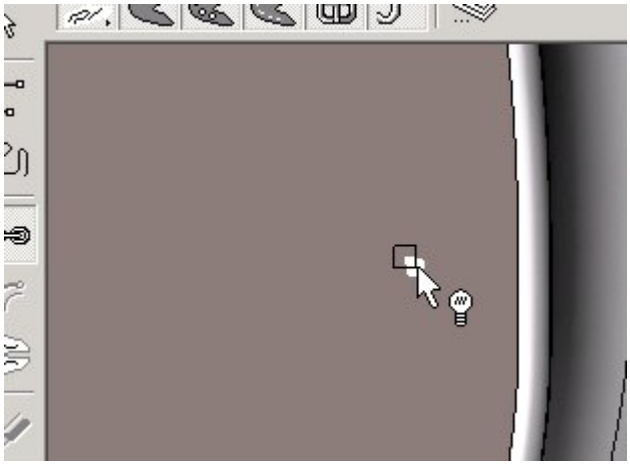


Figure 6 - Selecting lights

If you want to move a light just select it and drag the place-holder to the new location while pressing the **Left Mouse Button**. While dragging two circles appear to give you a better understanding of the 3D position of the light. Lights always point towards the centre of the project.

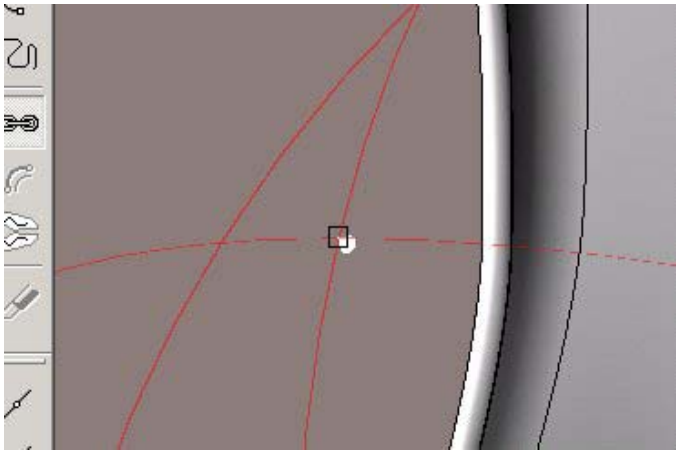


Figure 7 - dragging lights

Changing the properties of a light requires that you select the appropriate light and then press the **Right Mouse Button**. On the pop-up menu select **Properties**. You can now change the color and intensity of that light.

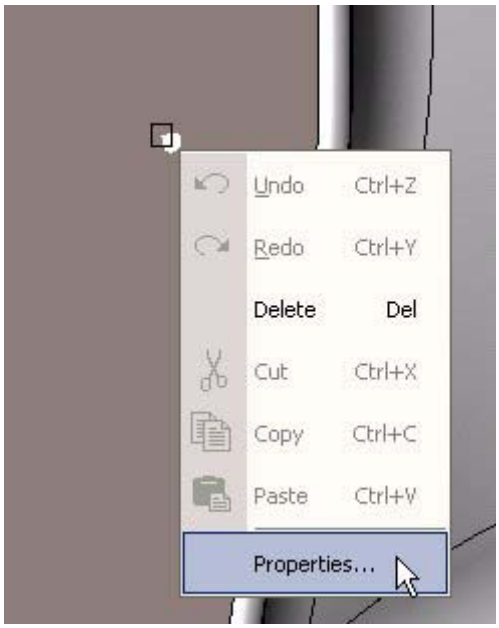


Figure 8 - Changing light properties

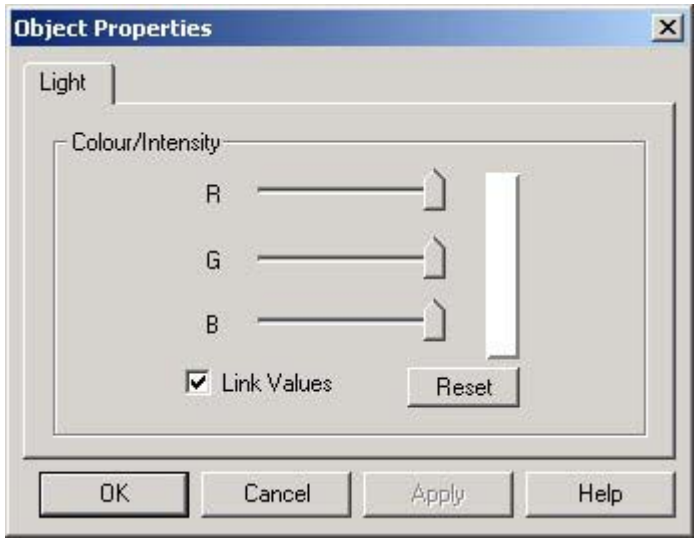


Figure 9 - Light properties panel

When you are through with changing the lights, go back to the normal selection tool by pressing **ESC** or the **Select** button in the **Tools** toolbar or choosing the menu option **Tools->Selection->Object Selection.** Any of these options will, once again, hide the light place-holders.

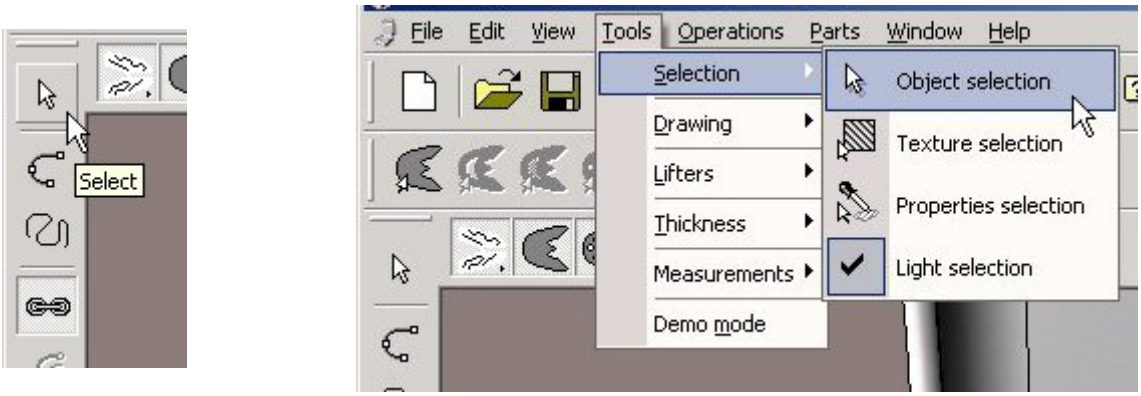


Figure 10 - returning to select mode

3.2 Lines

Lines are the foundation of a car seat style. Lines will identify the limits of the different pieces of the car seat, define stitch lines, pipes, holes, etc. It is by creating new lines and changing them that you will construct and alter your design.
We will now see how to create new lines, delete and change them.

3.2.1 Creating new lines

To start a new line you must select the line drawing tool. You can do this by selecting the **Curved Line** button in the **Tools** toolbar, or the **Tools->Drawing->Line** menu option. The cursor changes to a crosshairs and you are now ready to draw new lines.

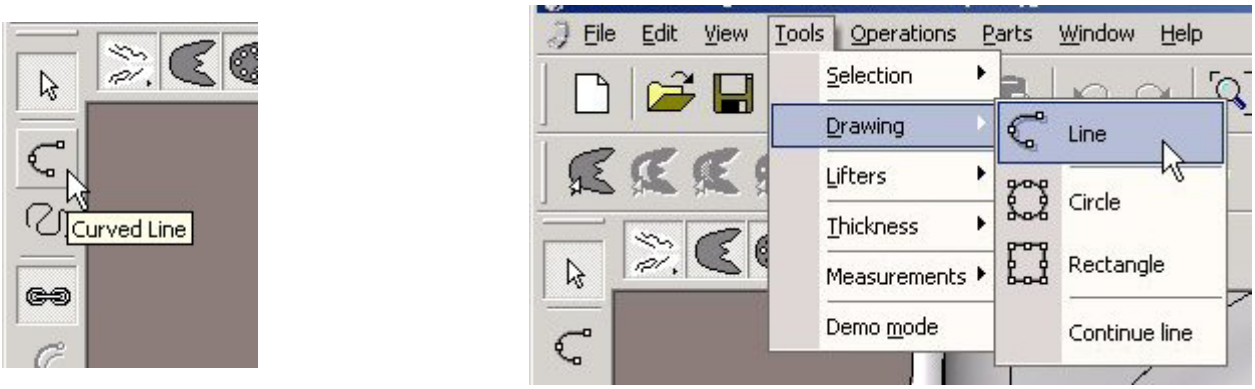


Figure 11 - activation of line tool

Just click with the **Left Mouse Button** on the surface you want to draw your line in, at the point you want your line to start. By moving the mouse and clicking at other locations you can build your line. As you construct it, you are always seeing how your new line looks like. To finish the line just double-click with the **Left Mouse Button** where you want it to finish.

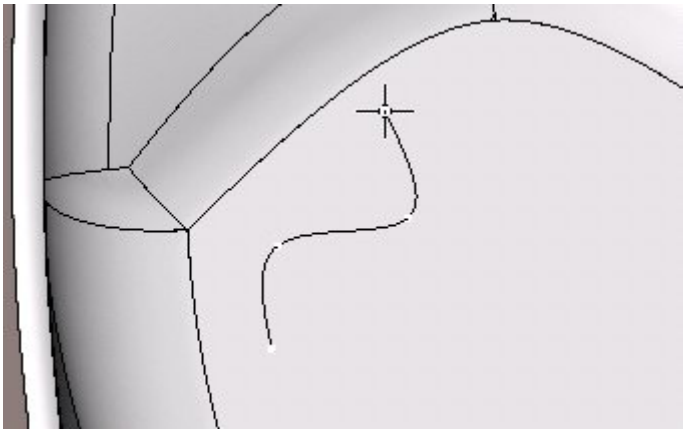


Figure 12 - Line drawing

At any time while drawing a new line you can press the **Right Mouse Button** to see a pop-up menu with editing options. Using this menu you can **Cancel** the current line (which you can also do by pressing the **ESC** key), **Finish** it (just as if you that double-clicked at the last point you placed). You can also **Add a Corner** point at the present location or **Remove the Last Point** you placed (can also be done by pressing the **Backspace** key).

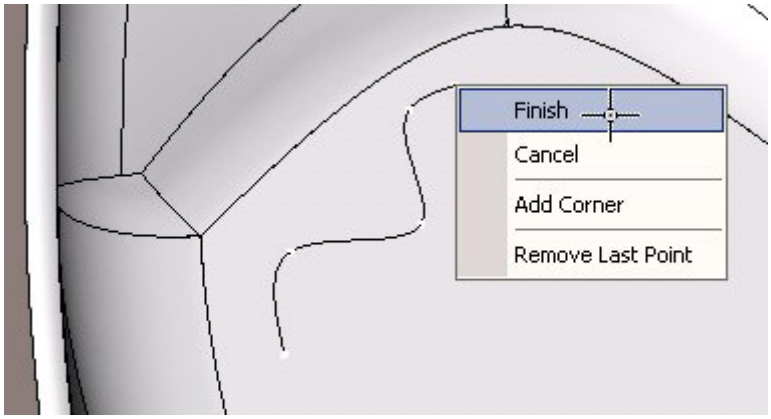


Figure 13 - context menu for line drawing

When you are through with drawing line you can go back to the selection tool by pressing **ESC** or the **Select** button in the **Tools** toolbar or choosing the menu option **Tools->Selection->Object Selection.**

3.2.2 Deleting a line

To delete a line you must first select it. To do so you must have the selection tool active. When the selection tool is active your mouse cursor will by a simple arrow. If the

selection tool is not active you can make it so by pressing **ESC** or the **Select** button in the **Tools** toolbar or choosing the menu option **Tools->Selection->Object Selection.**

Now all you have to do is click with the **Left Mouse Button** on the line you want to delete. The line will be selected as can be seen by the white squares marking the control points. Press the **Delete** key to delete the selected line.

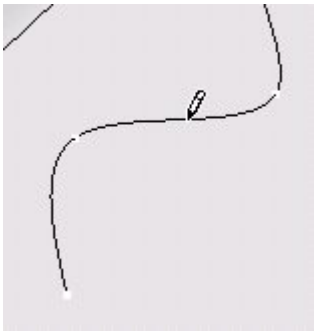


Figure 14 – handle feedback

You can delete more than one line at once. All you have to do is select all the lines you want to delete before pressing the **Delete** key.
You can select multiple lines by holding down the **Ctrl** key while you click on the lines, or by pressing the **Left Mouse Button** down while you drag a box around the line you want to select. All line inside the box you defined will be selected when you release the **Left Mouse Button**.

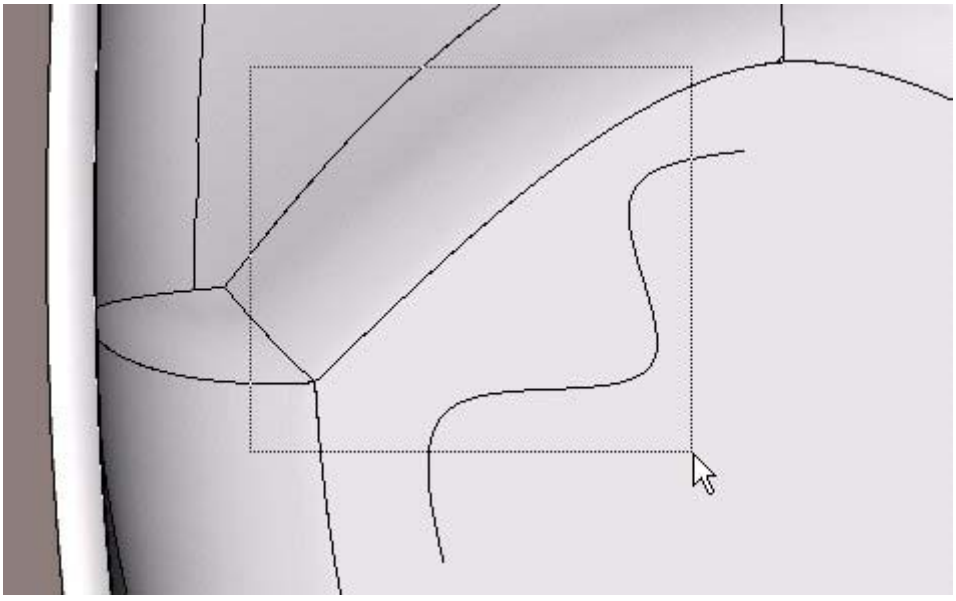


Figure 15 - net selection

3.2.3 Changing a line

To change a line you must first select it. You can only change one line at a time, so you will not by able to change any line if more than one are selected at the time.

With the line selected, if you move the mouse over a control point (the white squares), the cursor will change to a pencil. Now if you press and hold the **Left Mouse Button** and move the mouse, the point will follow the cursor to a new location. Just release the mouse button when you are happy with its placement.

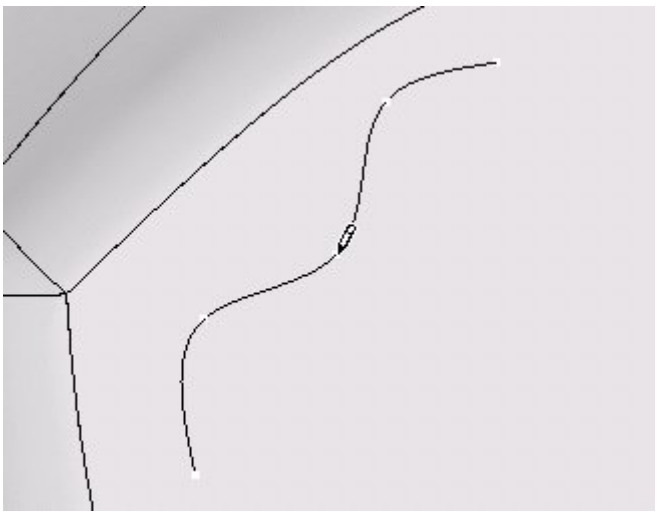


Figure 16 - handle editing

To remove a control point move the mouse cursor over that point while pressing the **Shift** key. The cursor will change to a pencil with a "**-**" sign on the top right corner.

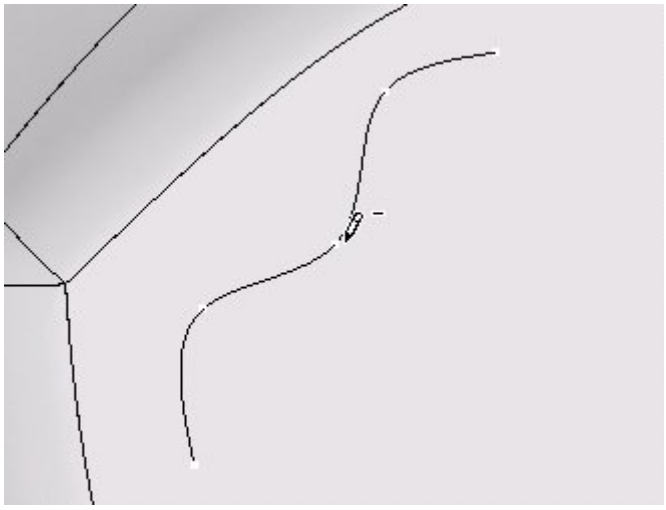


Figure 17 - handle removal

Now, if you press the **Left Mouse Button** the control point will be deleted.

To add a new control point, move the cursor to the point on the selected line where you want to insert the new control point. Press the **Shift** key and a "**+**" sign will appear on the top right corner of the pencil shaped cursor.

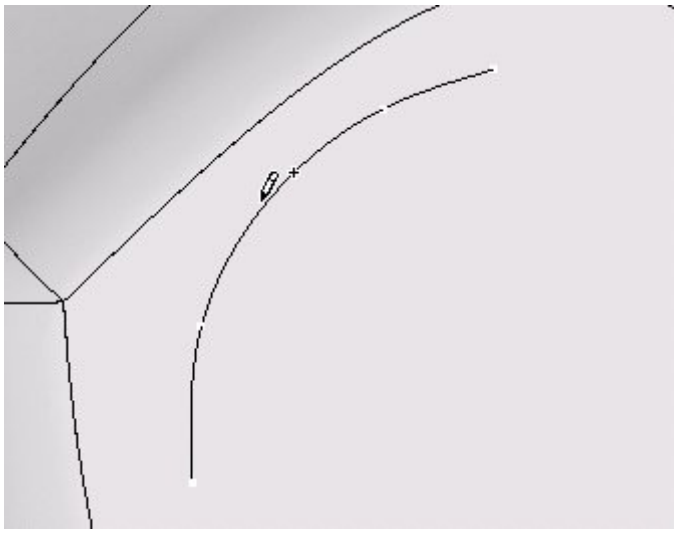


Figure 18 - handle addition

Press the **Left Mouse Button** and a new control point will be inserted at the location.

3.2.4 Creating rectangles and ellipses

There are two special classes of lines: rectangles and ellipses. To create either you will have to select the menu option **Tools->Drawing->Rectangle** or **Tools->Drawing->Circle**.

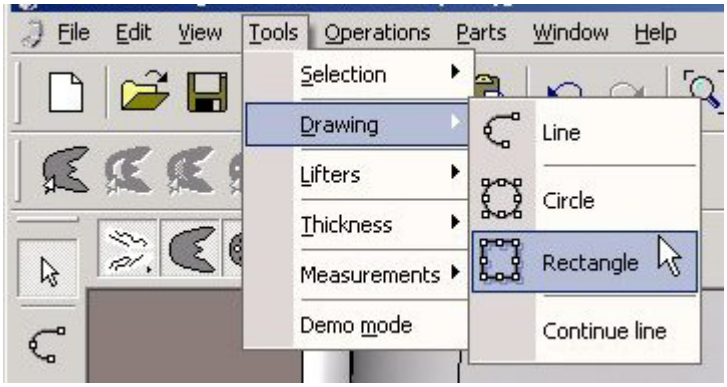


Figure 19 - activation of rectangle tool

After selecting the appropriate tool, click with the **Left Mouse Button** in the place where you want the first corner of the object. Then, keeping the **Left Mouse Button** pressed, drag the opposing corner into place. Release the **Left Mouse Button** to finish.

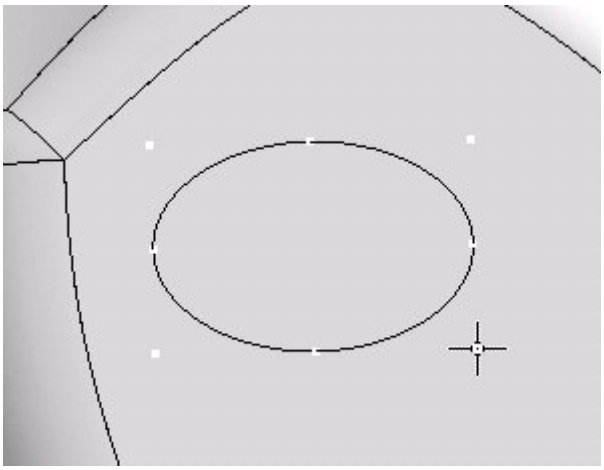


Figure 20 - ellipsis creation

3.3 Parts

Lines are the base of any design… but the meat of it is the parts. They represent the pieces that make up your seat. Together with accessories, stitches and pipes, they are what will be shown in the final product. The lines and surfaces over which everything was built will be hidden from view.

Here we will see how parts are created from the style lines, how to change their thickness, offset. How to delete them, add holes and padding effects.

3.3.1 Creating a part

After you have created the lines you will want to define the textile or leather pieces of your seat. To do so you must first select the menu option **Parts->Create Part** or press the **Define part** tool in the **Parts** toolbar.

Figure 21 - activation of part tool

Any part already defined will be hidden to unclutter your view of the lines. Now you must explain the software which is the part you want to create. You do so by clicking in each line segment that defines the border of the part, in sequence. The direction of the sequence is irrelevant, as is the starting point, but you must click with the **Left Mouse Button** in every segment.

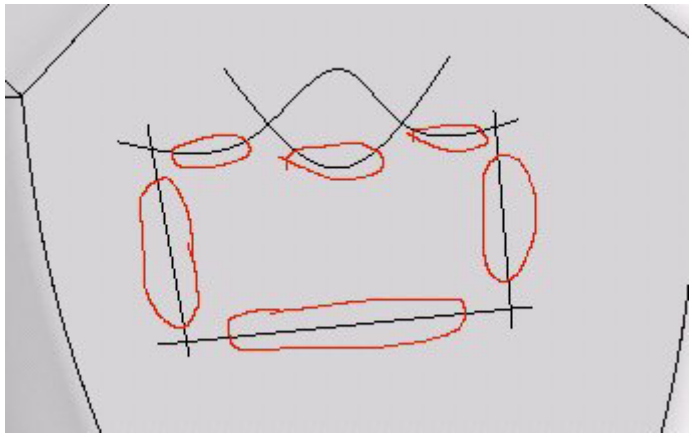


Figure 22 - part creation

When you have finished laying down the sequence press the **Right Mouse Button** and select **Finish Part** from the pop-up menu. You can also cancel the operation or start it over.

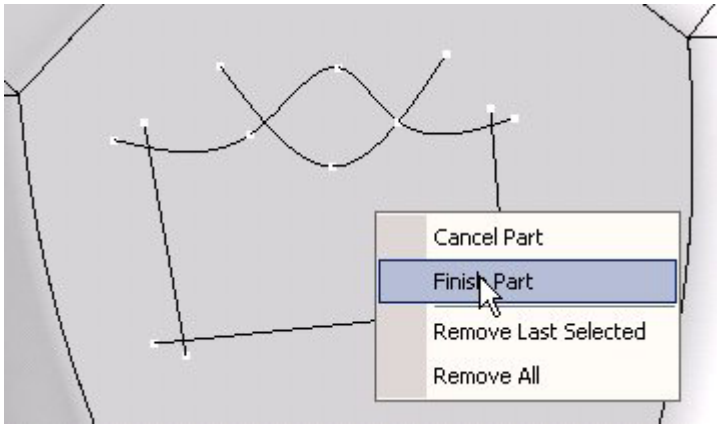


Figure 23 - part creation context menu

Your new part will appear on screen with its default characteristics.

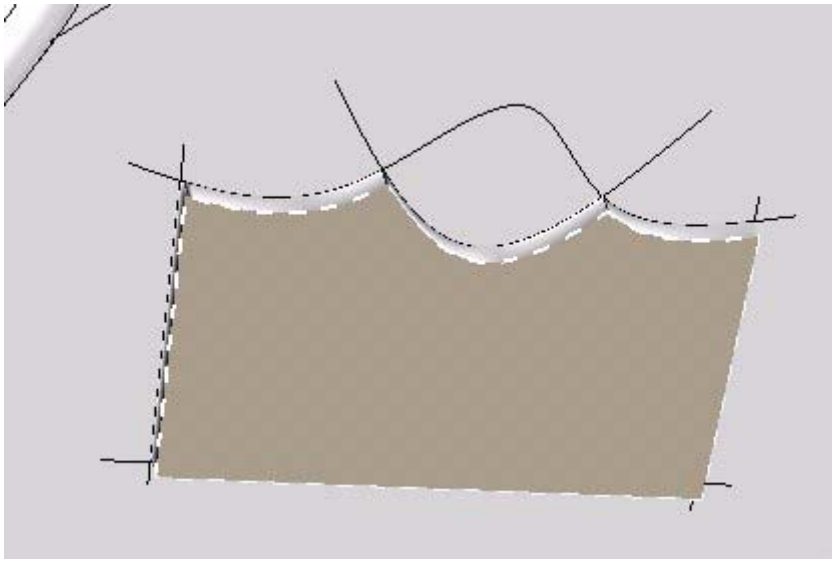


Figure 24 - part feedback

After a part has been created it is selected by default. A flashing line along the edge of the piece will show that it is selected. It can also be selected at any time by clicking on it with the **Left Mouse Button** while the selection tool is active.

When a piece is selected you can press the **Height** and **Thickness** buttons in the **Offsets** toolbar, to change how thick and how much apart from the surface should the piece be.

Figure 25 - part modification

You can also press the **Delete** key to remove an unwanted part.

3.3.2 Holes and padding

Pieces can have holes in them, and areas of it can be raised to simulate padding or overlapped pieces.
To create a hole select the appropriate part and then select the menu option **Parts->Create Holes->From Primitives** or press the **Apply hole to part** tool in the **Parts** toolbar.

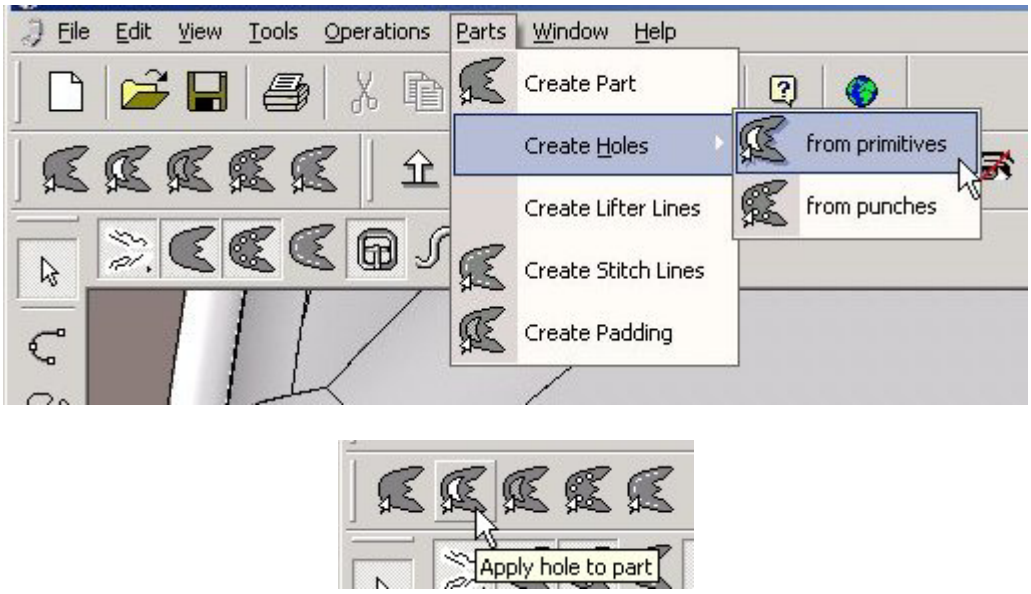


Figure 26 - activation of part hole tool

To create a padding zone select the part and the menu option **Parts->Create Padding** or press the **Apply padding to part** tool in the **Parts** toolbar.

Figure 27 - activation of padding tool

In both cases you will now have to define the area to remove or rise. You do so in the same way you defined the part. When you have clicked in all the segments, used the **Right Mouse Button** to call the pop-up menu and select to **Finish**.

If you are creating a hole it will now appear in the part. If you were making a pad a dialog box with the padding options will now be presented

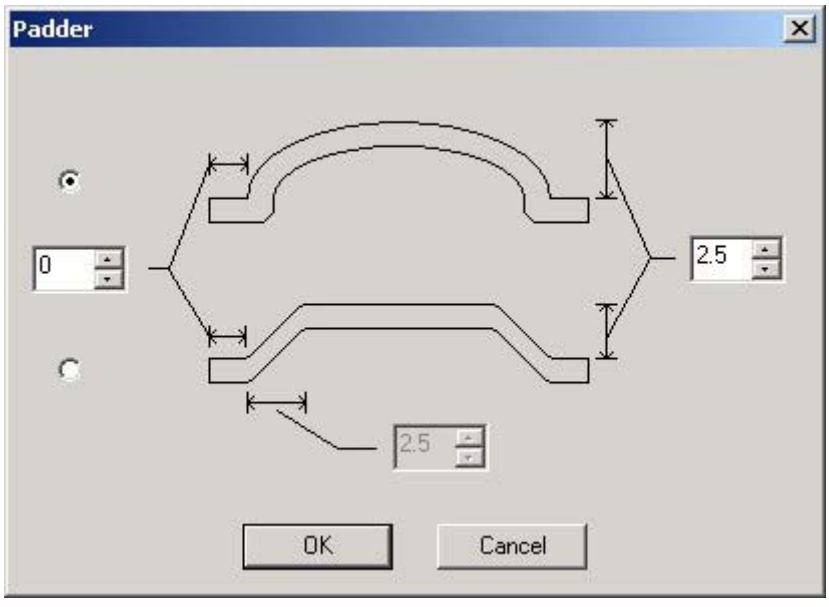


Figure 28 - padding tool panel

Notice that if change the original lines you used to create the part, its holes and padding regions, the part will be regenerated to reflect the changes. In this way you can make

changes to your original style, even after all the work is done, and everything is automatically updated – without anymore work from you.

3.4 Textures, Stitches, Accessories and Pipes

We have created the style lines, and used them to generate parts. We made holes and padding regions in the parts, made them thicker and closer or further away from the original surface. Now we will learn how to add textures and material properties to parts to make them more realistic. To finish covering the construction elements we will see how to make stitch lines, pipes and how to place accessories.

3.4.1 Texturing parts

Textures can be applied to parts to give them a more realistic look. To do so select the piece and press the **Right Mouse Button**. In the pop-up menu that appears, select the option **Properties**.

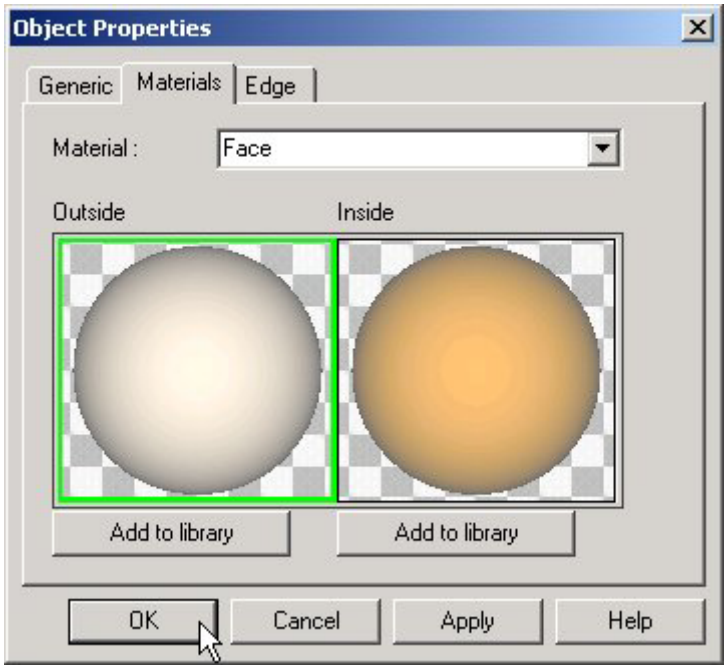


Figure 29 - object properties

In this dialog you can define the material appearance of both the front and back faces of the part. You can define textures, colors, shininess, transparency, bumpmapping and reflection.

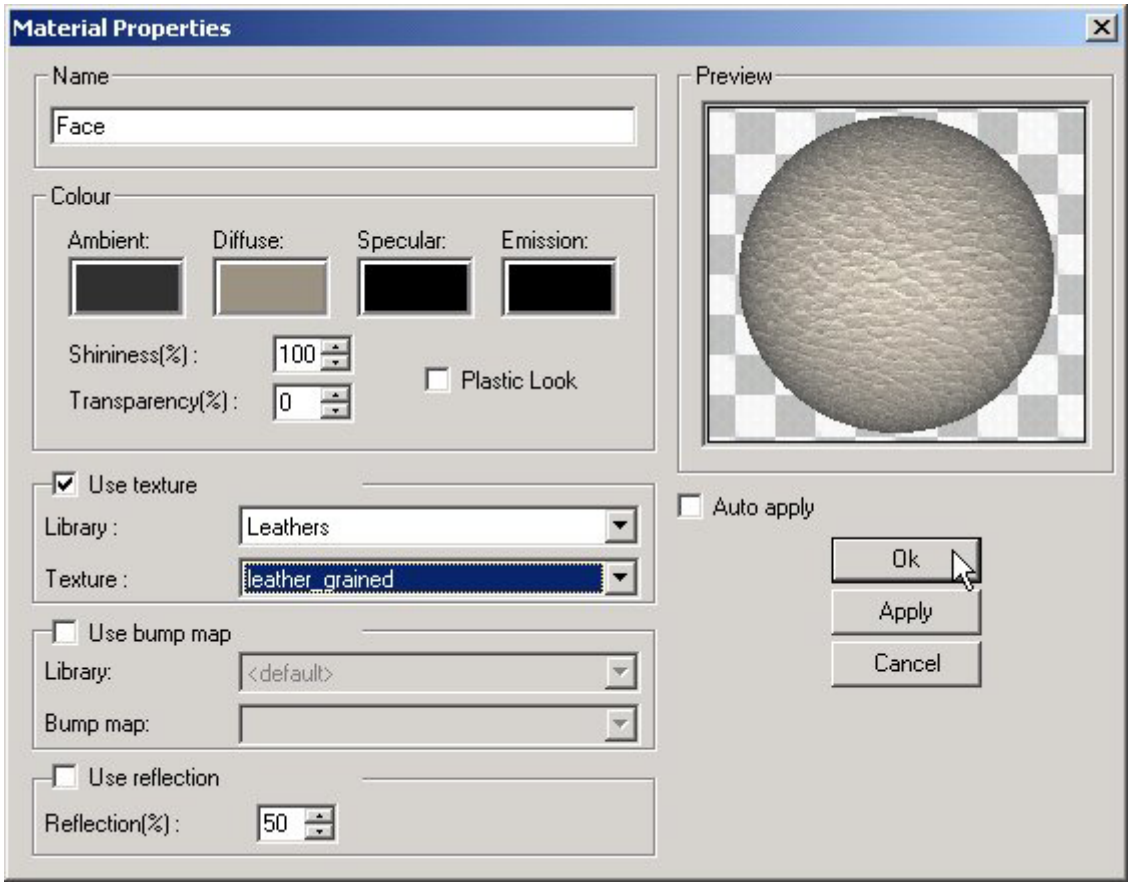
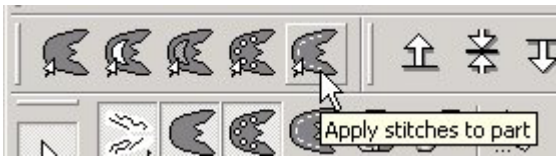


Figure 30 - material properties

3.4.2 Applying stitches to parts

Parts can have stitches applied along their edges. You can have multiple rows of stitching at user defined distances.
To apply stitching first you must select the part to be stitched. Then you either press the **Apply stitches to part** button in the **Parts** toolbar, or you can also select the menu option **Parts->Create Stitch Lines**.



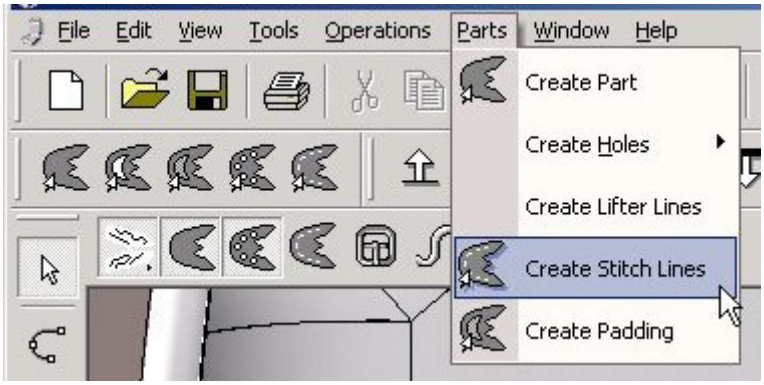


Figure 31 - activation of stitches tool

Both options will open a new dialog.

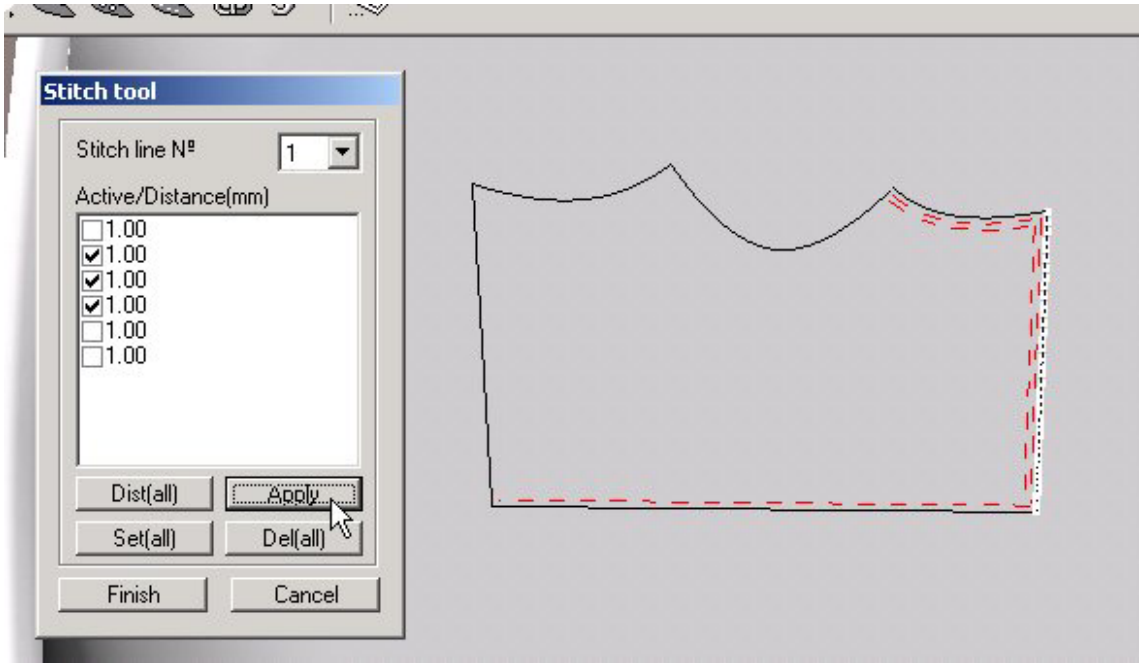


Figure 32 - stitches parametrization

Using this dialog you can select with line segments have stitches, at what distance those stitches will be from the edge, and how many lines of stitches there will be (to a maximum of four).
Each time you select a line segment it will be highlighted so you can see which segment is which. You can also use the **Apply** button to check that the current parameters are what you intend. Select **Finish** when you are happy with your selections and the new stitch lines will appear.

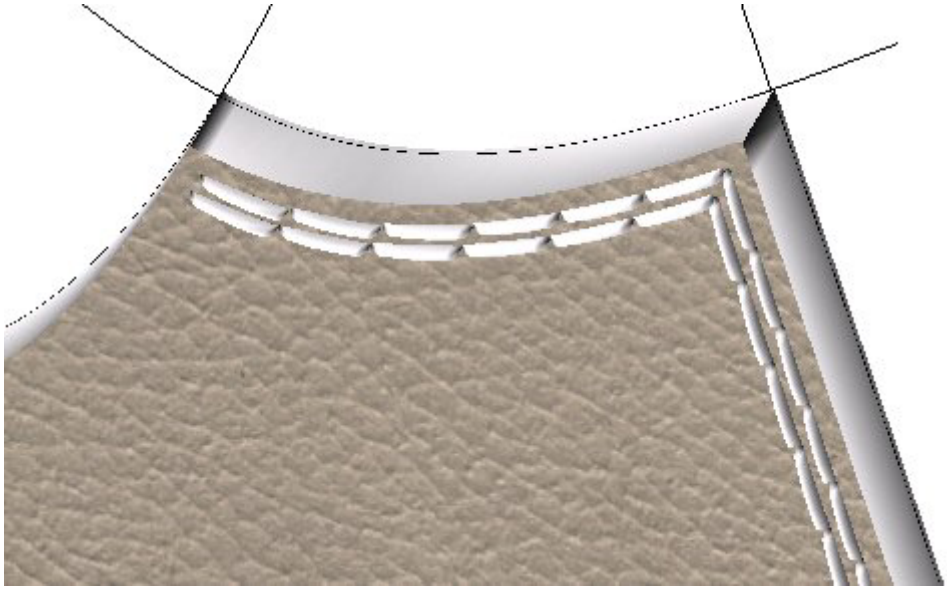


Figure 33 - created stitches

3.4.3 Applying stitches and pipes to lines

Besides applying stitches to parts, you can also apply them to lines. In this case the stitches will simply lie along the line. This can be useful to recreate decorative stitching, for instance.
You can also create pipes along lines. Pipes are simple tubular structures with a round, rectangular or triangular section, which can be used to achieve several objectives. They can give a rounder appearance to the edge of a part, emulate decorative embossing, etc.

To create either a pipe or a stitch line you must first select the intended line. To make a pipe select the menu option **Operations->Pipe**. To make a stitch line select **Operations->Stitches**.

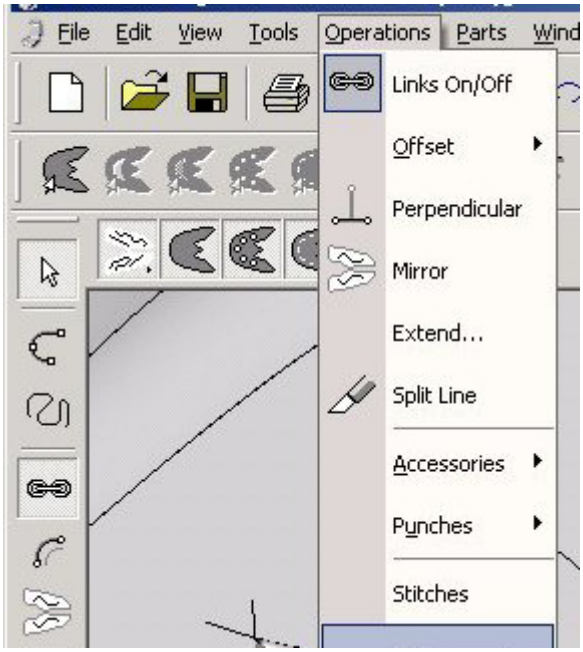


Figure 34 - creating pipes

After they have been created you can select the stitches or the pipes, used the **Right Mouse Button** and select **Properties** in the pop-up menu to change their appearance.

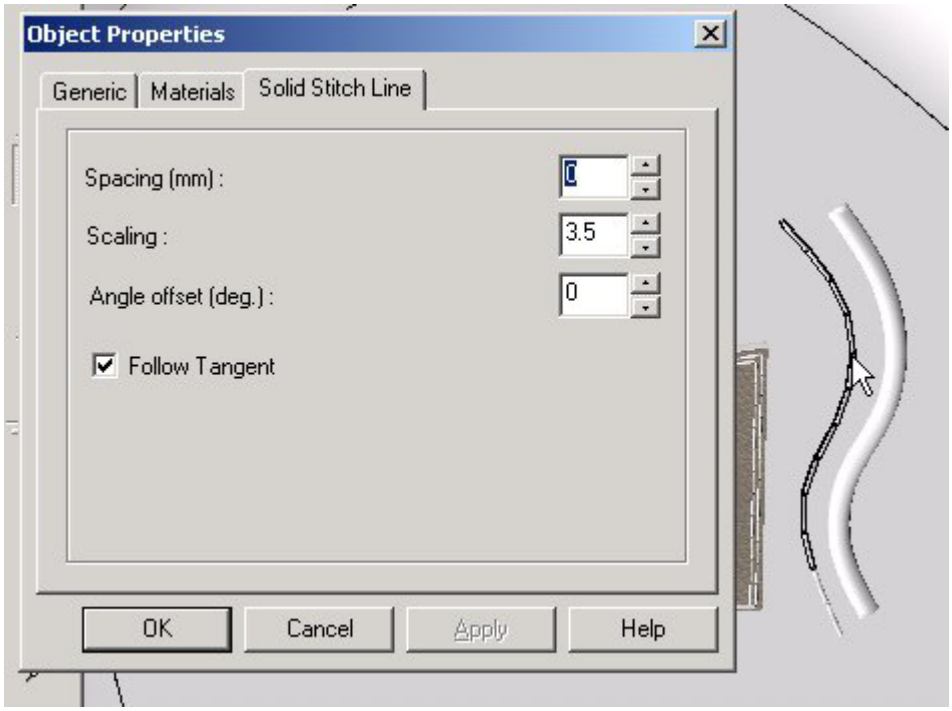


Figure 35 - stitches control panel

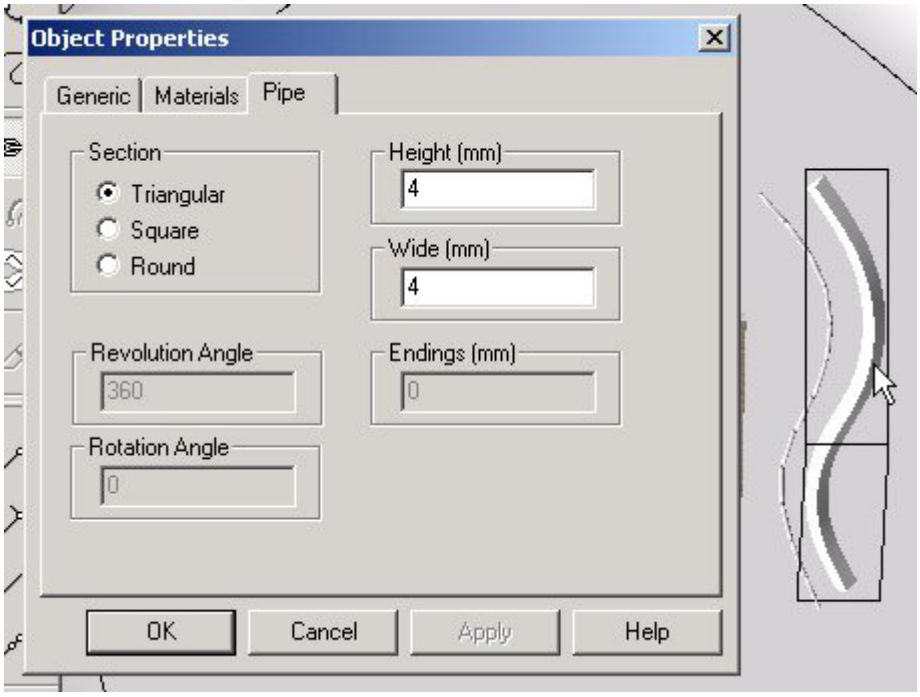


Figure 36 - pipe control panel

3.4.4 Placing accessories

Accessories can be any object or tag created outside CarSeat Design. They can be imported into the program and placed anywhere over a surface.
To see a list of all the available accessories, make sure the **Decorations toolbar** button in the **General 3D** toolbar is depressed.

Figure 37 - activation of decoration toolbar

Select the accessory you wish to place from the **Decorations** toolbar. Press the **Place** button and click with the **Left Mouse Button** on the surface you want the accessory to be placed. Move the mouse to position it in the correct location and press the **Left Mouse Button** again to anchor the accessory.

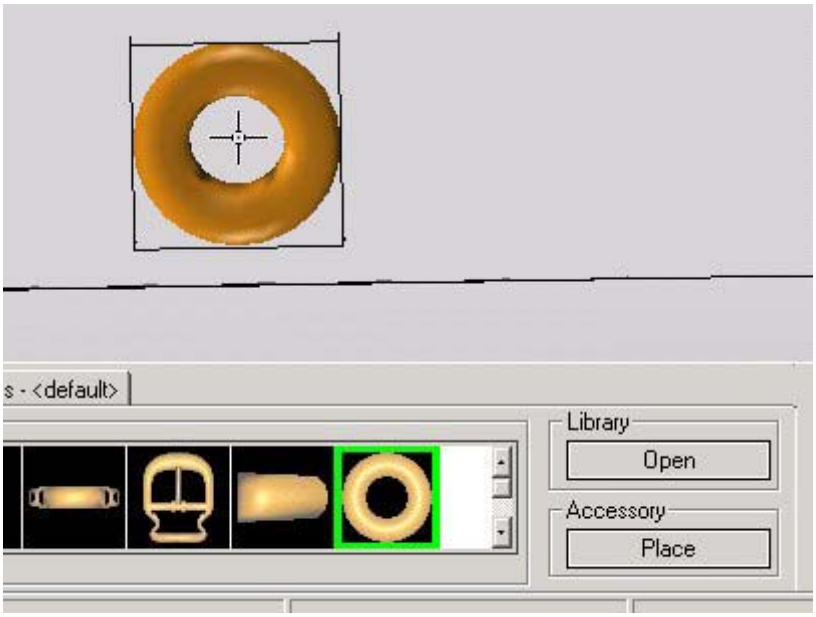


Figure 38 - placing an accessory

4. Sketching interface

Drawing circles, rectangles, triangles and other shape might feel artificial. To overcome this limitation we included a whole new way of letting you tell the software what you want it to draw. This works using artificial intelligence to recognize user made sketches, and replacing them with the appropriate object.

To activate the sketching mode press the **Sketching Tool** button in the **Tools** toolbar.

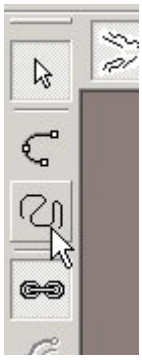


Figure 39 - sketching tool activation

Your mouse cursor will change to a crosshair. Now press and hold the **Left Mouse Button** where you want your sketch to begin. Keeping the mouse button press draw the figure you intend with the mouse. When finished release the mouse button.

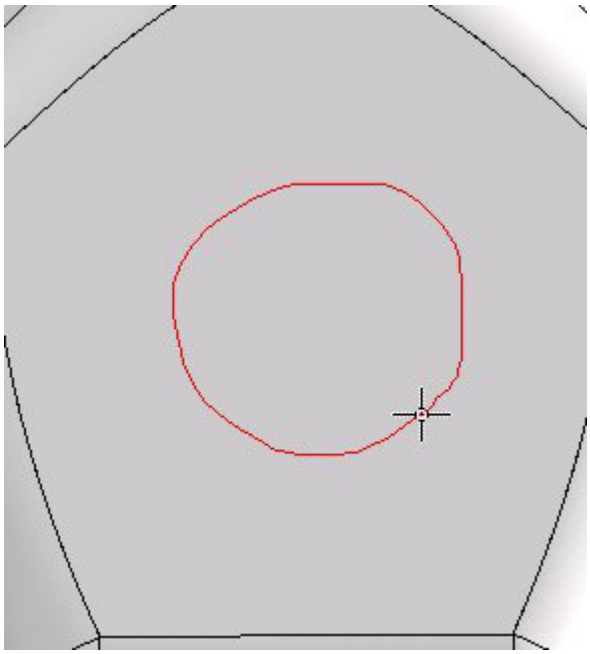


Figure 40 - initial sketch

When you are done, the software will analyze your sketch and provide you with a choice of all the possible interpretations it could find. Just select the one closest to what you intended and your sketch will be replaced with the final version.

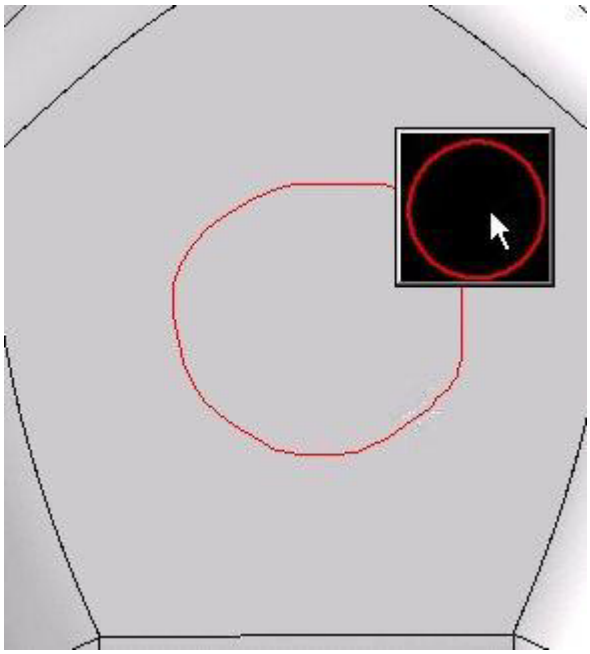


Figure 41 - expectation list with circle

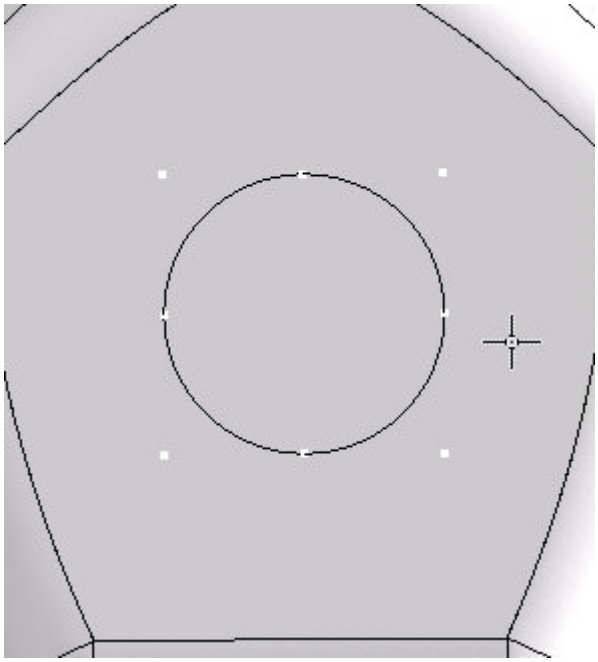


Figure 42 - final recognized circle

The sketching module can recognize circles, ellipses, rectangles, triangles, lozenges and lines.
The tool can also recognize the delete command. To delete an object just draw a quick zigzagging scratch over its edge. You will see the command **Delete** as one of the possible options.

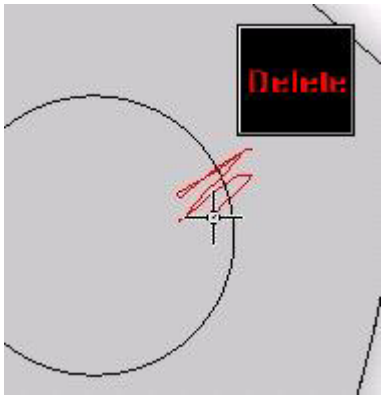


Figure 43 - delete gesture

5. Installation

To install CarSeat Design run Setup.exe on the Install folder and follow the instructions.

By default, the sketching tool is configured to be used on a system that has the .NET Framework 1.1 and Web Services running on the same computer where CarSeat Design is installed.

The WebService required by this tool must be installed on the following URL http://localhost/SmartSketchesWS/StrokeRecognizer.asmx .
If this is not the case, run the application and go to the File/Preferences/Stroke tool config menu option. There you can specify the correct URL of the Web Service, as well as the username and the Port used in the communication process between the application and the service.

To use the Sketching tool on CarSeat Design it's necessary to have installed and be running the .NET Framework 1.1, Web Services and configuration Database.
To do so copy the Docs\SmartSketchesWS folder from the installation CD to your Inetpub\WwwRoot directory. Start the Internet Services Manager console (Control Panel -> Administrative Tools -> Internet Services Manager). There right click the SmartSketchesWS folder and select properties. On the Home Directory tab, press the Create button. Finally press OK until you exit the console.

The WebServices framework is using a Microsoft SQL Database. To create the SmartSketches Database you can use the CreationScript.sql script file under the SQLDatabase directory on the installation CD. Whenever you need to restore the Database you can use the Restore file on the same directory. This file is a backup of the original database.

You also have to edit the Web.config file located on the SmartSketchesWS directory. Open it with any text editor, go to the 4th line and replace the text "source=SMARTSKETCHES" by "source=<YOUR SQL Database Source>"